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COMMUNICATION SYSTEM WITH ISDN AS A BACKUP OF INTER-PBX TIE TRUNK

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A private branch exchange (1) comprises a switch (10) to which are connected line interfaces (13) accommodating PBX telephones (5), a tie trunk interface (11) accommodating a tie trunk (3) to a distant PBX (2), an ISDN interface (12) accommodating the public switched ISDN network (4), and speech codecs (14). Each codec (14) converts a 64-kbps signal to a lower bit-rate signal and converts a lower bit rate signal to a 64-kbps signal. A mux/demux unit (16) is connected between the codecs (14) and the switch (10) for multiplexing the lower bit rate signals from the codecs (14) into a multiplex signal and demultiplexing a multiplex signal into lower bit rate signals for .coupling to the codecs (14), respectively. The switch (10) is controlled in response to a call from a PBX telephone (5) to establish a connection between a line interface (13) and any of the codecs (14) and a connection between the mux/demux unit (16) and the tie trunk interface (11) when the distant PBX (2) is the destination. If the call is destined to an ISDN user, a connection is established between the line interface (13) and the ISDN interface (12). Should the tie trunk (3) fail, a backup connection is etablished between the mux/demux unit (16) and the ISDN interface (12) and the ISDN network (14) is signalled to establish a connection between the ISDN interface (12) and the distant PBX (2).

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CLAIM 1.   A private branch exchange comprising:

switch means;

a plurality of line interfaces connected the switch means for accommodating user telephones;

a tie trunk interface connected to the switch means for accommodating a tie trunk connected to a distant private branch exchange (PBX);

an ISDN (integrated services digital network) interface connected to the switch means for accommodating a public switched ISDN network;

a plurality of bit-rate compression/expansion means connected to the switch means, each of the bit-rate compression/expansion means converting a 64-kbps digital signal to a digital signal of a bit rate lower than 64-kbps and converting a said lower bit rate digital signal to a said 64-kbps digital signal;

mux/demux means connected between said plurality of bit-rate compression/expansion means and the switch means for multiplexing the lower bit rate digital signals from the bit-rate compression/expansion means to produce a multiplex signal and demultiplexing a said multiplex signal into a plurality of lower bit rate digital signals and applying said plurality of lower bit rate digital signals to said bit-rate compression/expansion means, respectively; and

control means associated with said line interfaces, said tie trunk interface and said ISDN interface for controlling said switch means in response to a call from a said user telephone to establish a connection between the line interface of the said user telephone and any of the bit-rate compression/expansion means and a connection between the mux/demux means and the tie trunk interface when said call is destined to the distant PBX, or a connection between the said line interface and the ISDN interface when said call is destined to a user telephone of the ISDN network, the control means monitoring the tie trunk interface for detecting a failure in the tie trunk and, in response, establishing a backup connection between the mux/demux means and the ISDN interface, instead of the connection between the mux/demux means and the tie trunk interface, and causing the ISDN network to establish a connection between the ISDN interface and the distant PBX.

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FIG. 1